Weems Creek Watershed Restoration Plan

Retrofitting

CENTER FOR WATERSHED PROTECTION

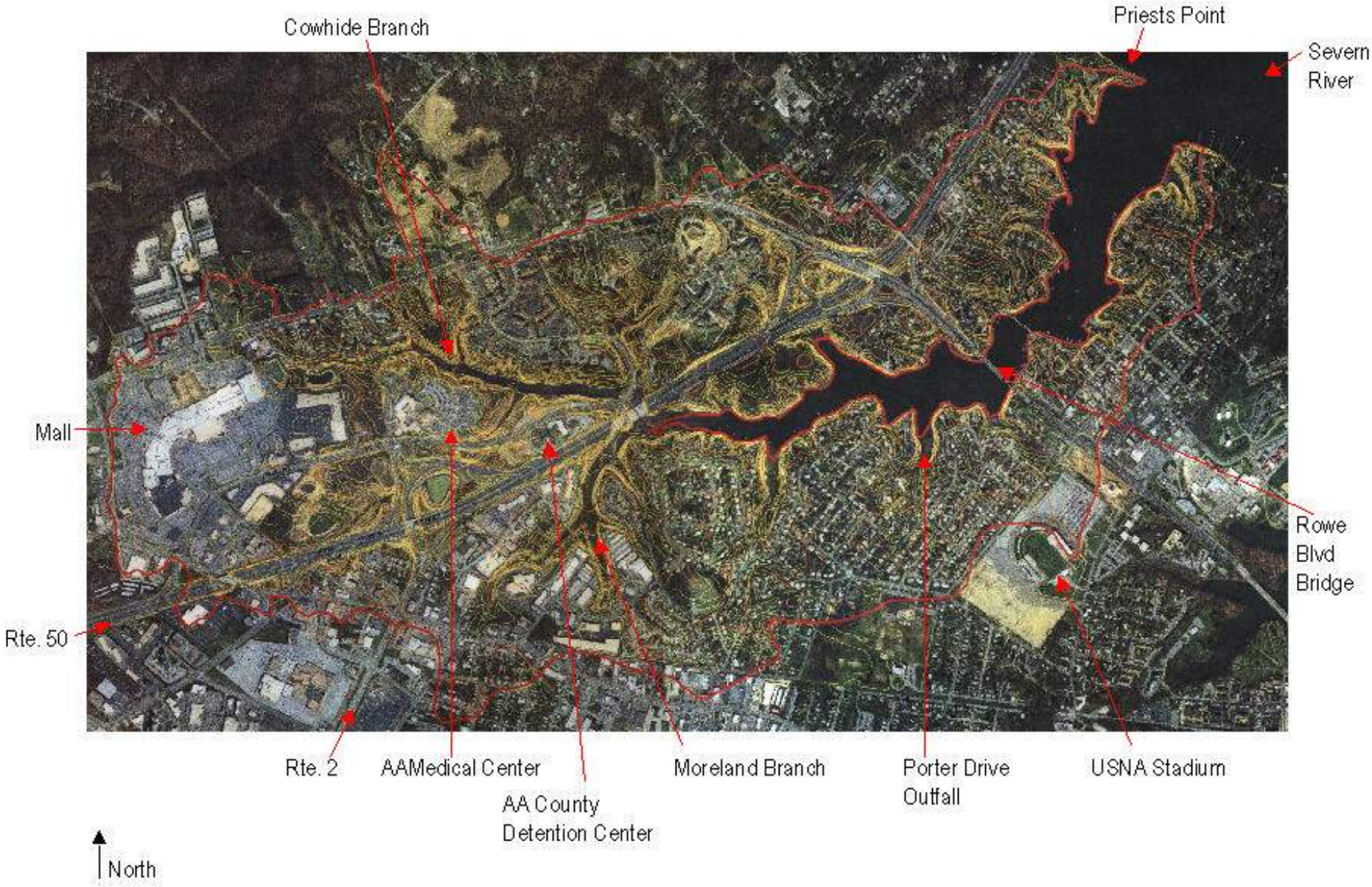
Weems Creek Conservancy

EcoLogix Group Solutions for Our Environmental Future

September 23, 2004

Scope

- Review existing studies and monitoring data
- Delineate subwatersheds
- Stream Assessment
- Stormwater retrofit inventory
- Priorities and subwatershed management plans


Cowhide Branch
Priests Point
Severn River
Mall
Rowe Blvd Bridge
Rte. 50
Rte. 2
AAMedical Center
AA County Detention Center
Moreland Branch
Porter Drive Outfall
USNA Stadium
North

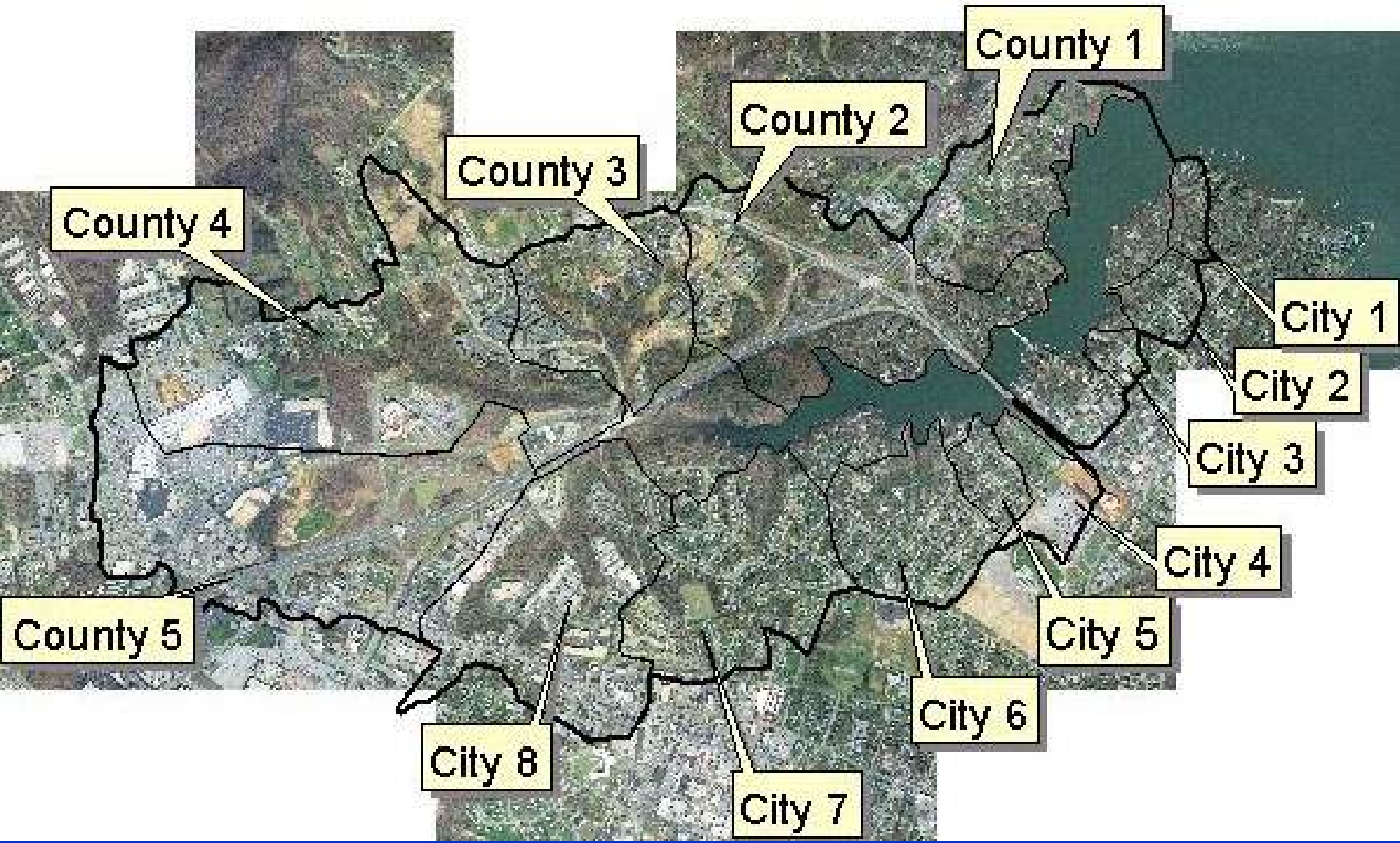
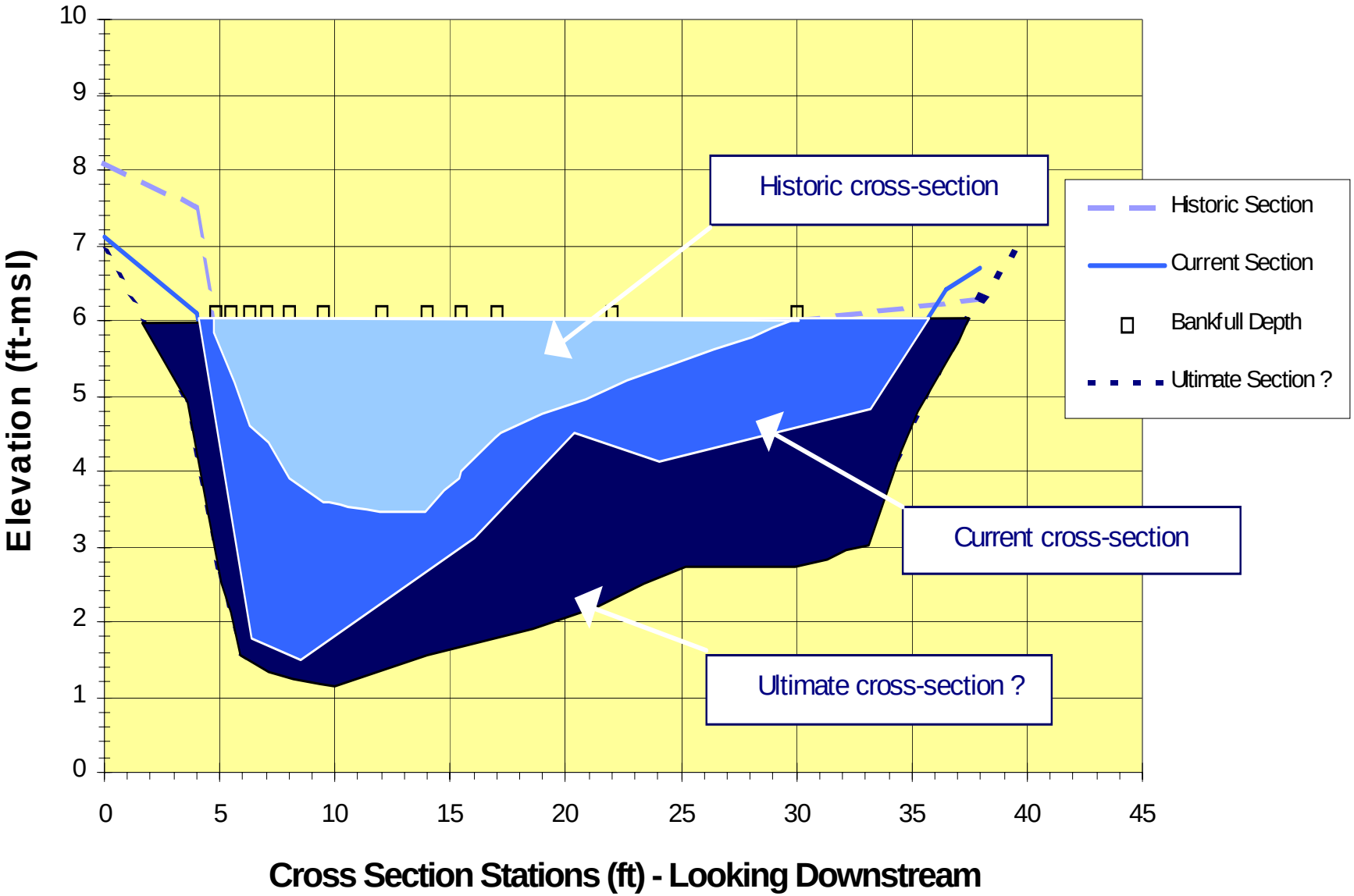

County 1
County 2
County 3
County 4
County 5
City 1
City 2
City 3
City 4
City 5
City 6
City 7
City 8

Table 2. Impervious Cover Estimation for Weems Creek Catchments

Catchments	Area (acres)	Impervious Cover %	ICM Category	Flow Status
City 1	13.01	13.9	Impacted	Intermittent
City 2	19.91	15.0	Impacted	Intermittent
City 3	9.39	17.2	Impacted	Piped to tidal
City 4	28.01	52.7	Non-supporting	Piped to tidal
City 5	19.06	27.9	Non-supporting	Perennial
City 6	72.26	23.3	Impacted	Piped to perennial stream
City 7	123.82	25.2	Non-supporting	Piped to perennial stream
City 8	163.95	45.1	Non-supporting	Piped to perennial stream
AA1	77.4	19.2	Impacted	Intermittent
AA2	177.78	20.4	Impacted	Intermittent
AA3	95.31	19.9	Impacted	Intermittent
AA4	256.11	26.6	Non-supporting	Piped to perennial stream
AA5	247.23	44.4	Non-supporting	Piped to perennial stream
Direct Drainage	137.76	14.0	Impacted	Both piped and intermittent
Watershed Impervious Cover = 28.9%				

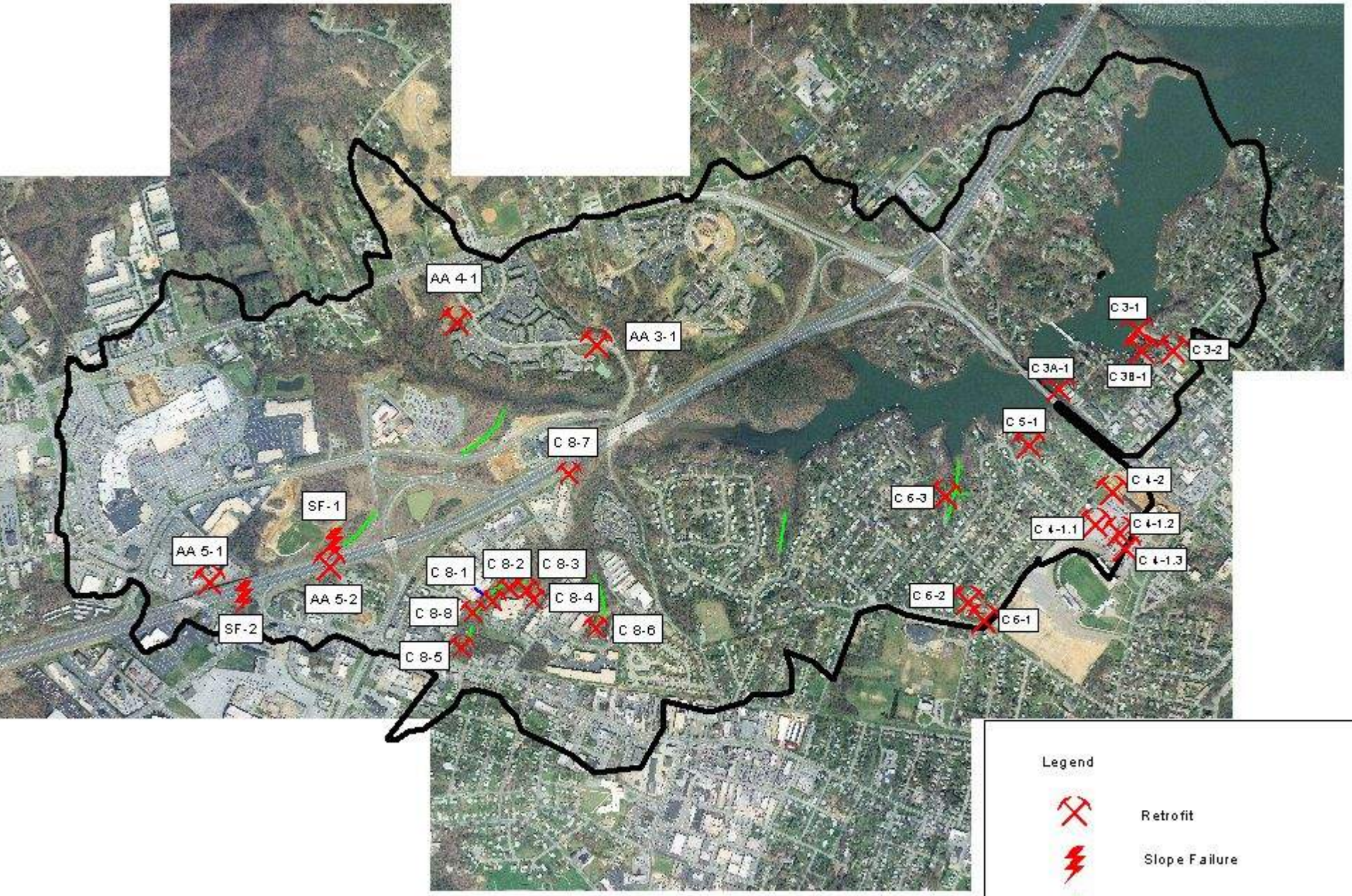
Channel incision and enlargement in City 8

High quality stream channel

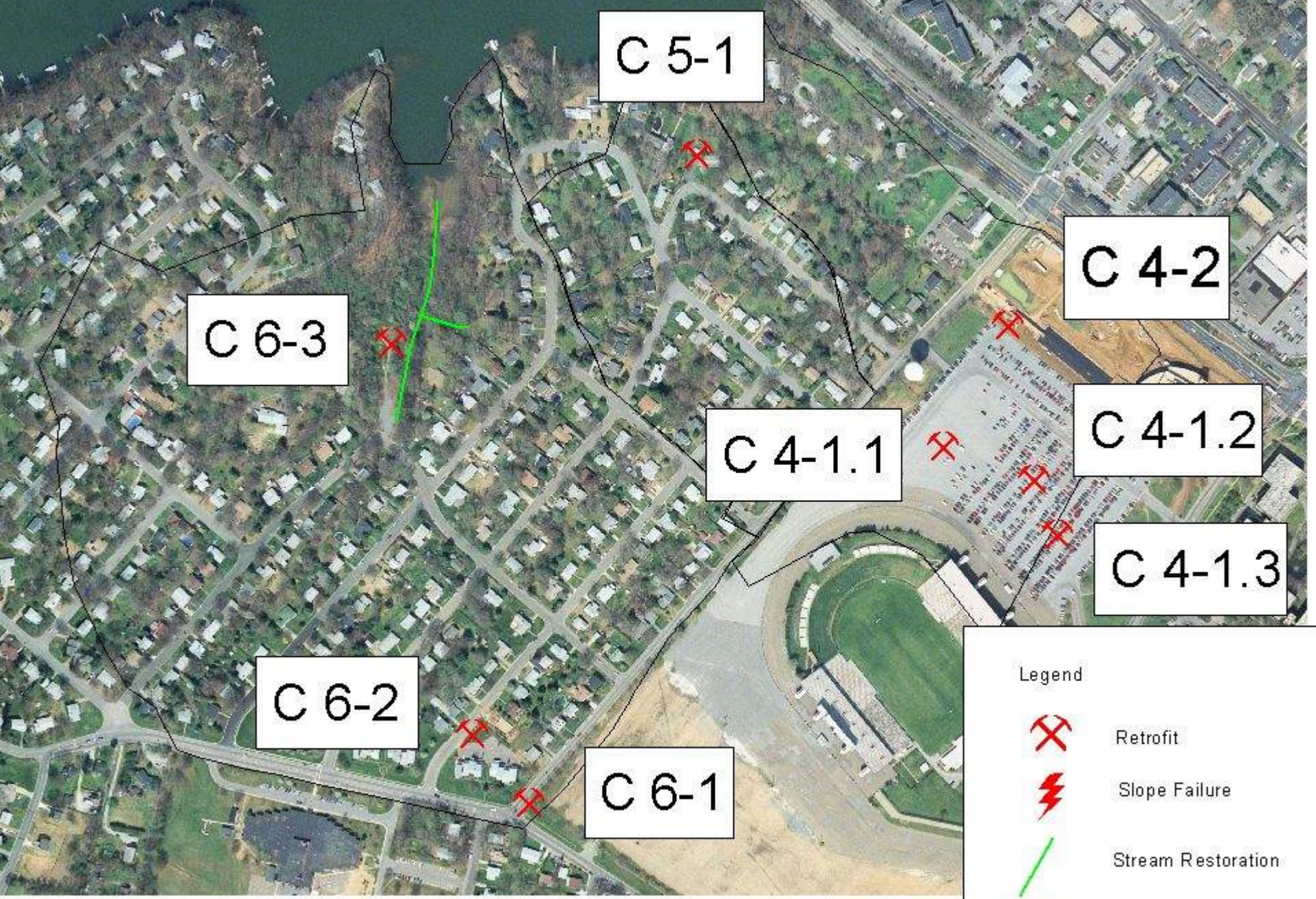

Elevation (ft-msl)
10
9
8
7
6
5
4
3
2
1
0
0
5
10
15
20
25
30
35
40
45
Cross Section Stations (ft) - Looking Downstream
Historic cross-section
Current cross-section
Ultimate cross-section ?
Historic Section
Current Section
Bankfull Depth
Ultimate Section ?

Retrofitting Goals

Catchment condition	Goals
Directly piped to tidal	- water quality improvement
Outlet to natural channel	- volume control – infiltration and channel protection
Outlet to intermittent channel	- water quality and assess channels for erosion potential



Weems Creek Retrofits



City 4.5.6 Retrofits

Example Projects and Concepts

1. Cedar Lane and Farragut Rd Existing

Proposed

Seattle Public Utilities (Sea Streets), 2004


Under Construction


2. USNA Stadium Lot Existing
2. 6. 2002


Proposed


Constructed

3. Existing Stream Condition downstream of Forest Drive

D.A. 25 acres
I.C. 65%
Stream: intermittent – highly degraded
Concept: Wetpond w/ CPv

4. Moreland Pkwy

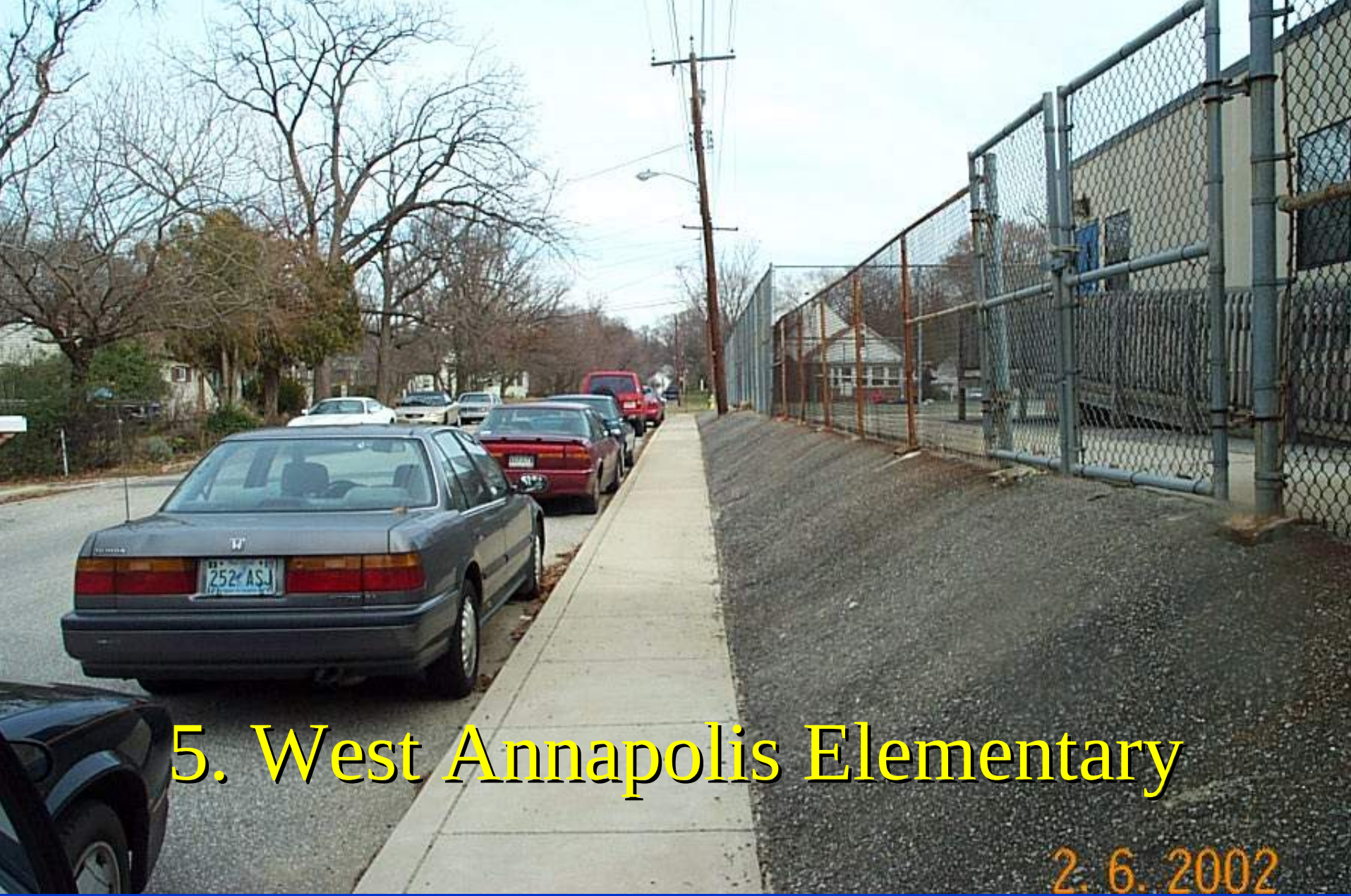
D.A. 63 acres

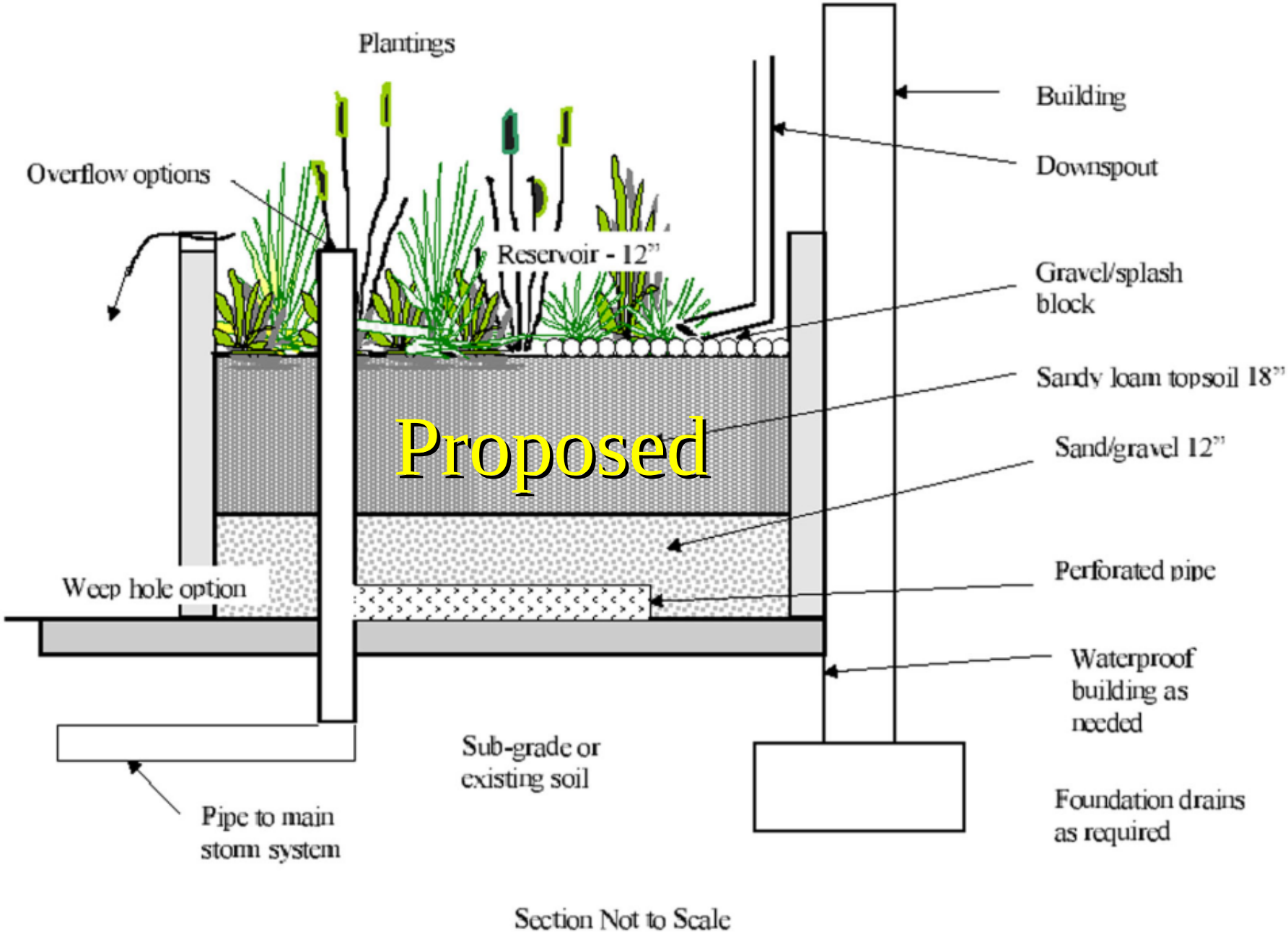
I.C. 45%

Stream: intermittent – highly degraded

Concept: New Orifice with w/ CPv


Downstream
12. 28. 2001


5. West Annapolis Elementary
2. 6. 2002



Portland Stormwater Manual, 2004

6. Existing Dry Pond

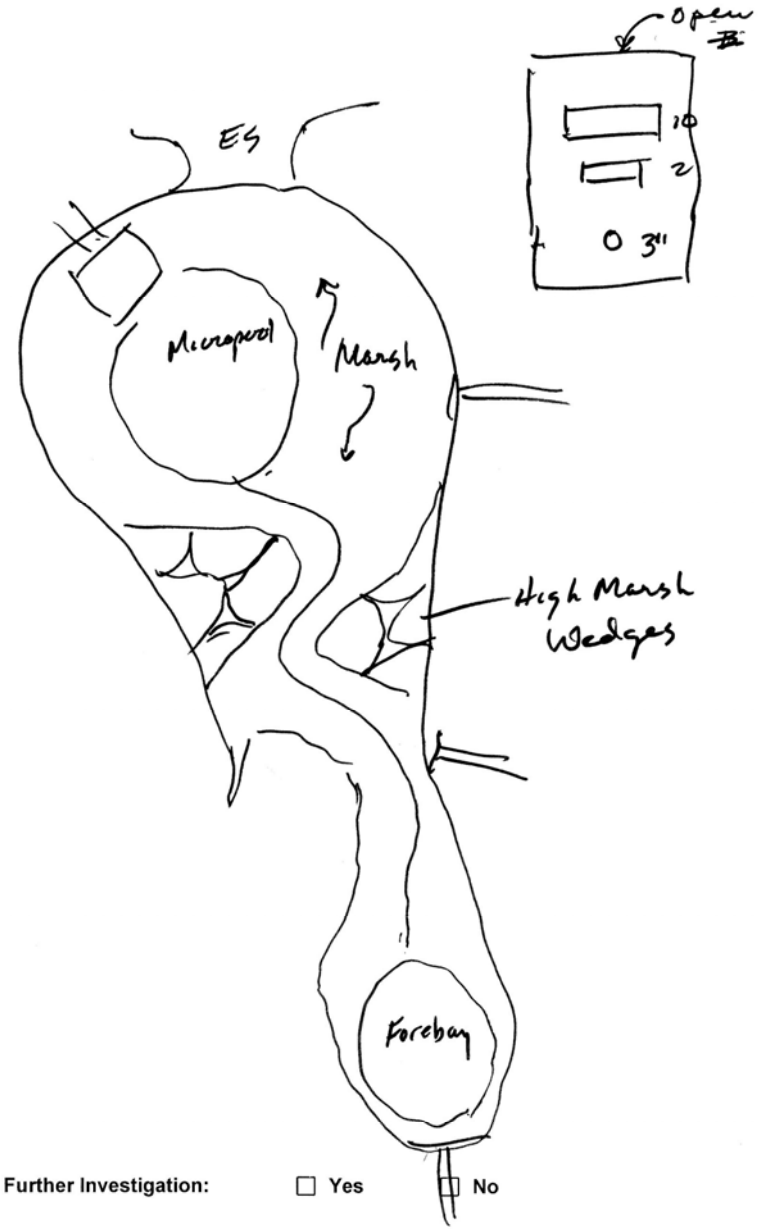
D.A. 27 acres

I.C. 35%

Stream: perennial – stable – flat slope

Concept: Next Slide

18. Additional Notes and/or Sketch Information:



19. Site Candidate for Further Investigation: ☐ Yes ☐ No

Appendix II. Retrofit Priorities for Weems Creek

Possible Retrofits	Description	Benefit $/pd/10yr	Points					
			Cost	CPv	WQv	Feasibility	Education	Total
City 8-5	N of West St. fail restor	1	5	5	5	3	4	22
City 6-3	Porter Drive outfall	1	5	5	5	3	3	21
City 6-1	Cedar Park & Naval Lot	7	3	3	5	4	5	20
City 8-6	Existing City Wet Pond		5	5	2	4	4	20
City 8-8	DS of 8-5 below 2nd outfall	1	5	5	5	3	2	20
City 4-1.1	Within Navy lot	6	3		5	4	5	17
City 4-1.2	Within Navy lot	6	3		5	4	5	17
City 4-1.3	Within Navy lot	6	3		5	4	5	17
City 4-2	Edge of Navy lot/Court parking	6	3		5	4	5	17
City 3-1	Tucker St. Cul du sac	6	3		5	3	5	16
City 3-2	West Annap Elem	9	2		5	4	5	16
City 4-3	East Edge Naval lot/Taylor	10	1		5	4	5	15
AA5-1	Linear Dry Pond near Sheraton	1	2	5	*	4	4	15
City 3B-1	End of Annap. St.	6	3		5	3	3	14
AA3-1	Existing Dry Pond in AA	1	5		2	3	4	14
City 6-2	Cdr Park/Goodrich Rd Townhouses	8	2	2	3	3	3	13
AA4-1	Existing Dry Pond 2 in AA	1	5		2	2	4	13
City 5-1	Corner of Schley on pumping statio	3	4		3	2	3	12
City 3A-1	Aparts next to Rowe	Low feasibility	2		4	2	2	10
City 8-1	Capital A adj to build	Existing	3		2	3	2	10
City 8-2	Capital B Comm retro	infiltration	3		2	3	2	10
City 8-3	Capital C Comm retro	performance	3		2	3	2	10
City 8-4	Capital D clogged infilt	uncertain	3		2	3	2	10
AA5-2	Instream CPv detention	Flooding concern		5		1		6
City 8-7	Existing SHA Pond	Needs maintenance						
	* Shaded retrofits are recommended for pursuit							

Small Scale Retrofits

Steps to constructing a rain garden:

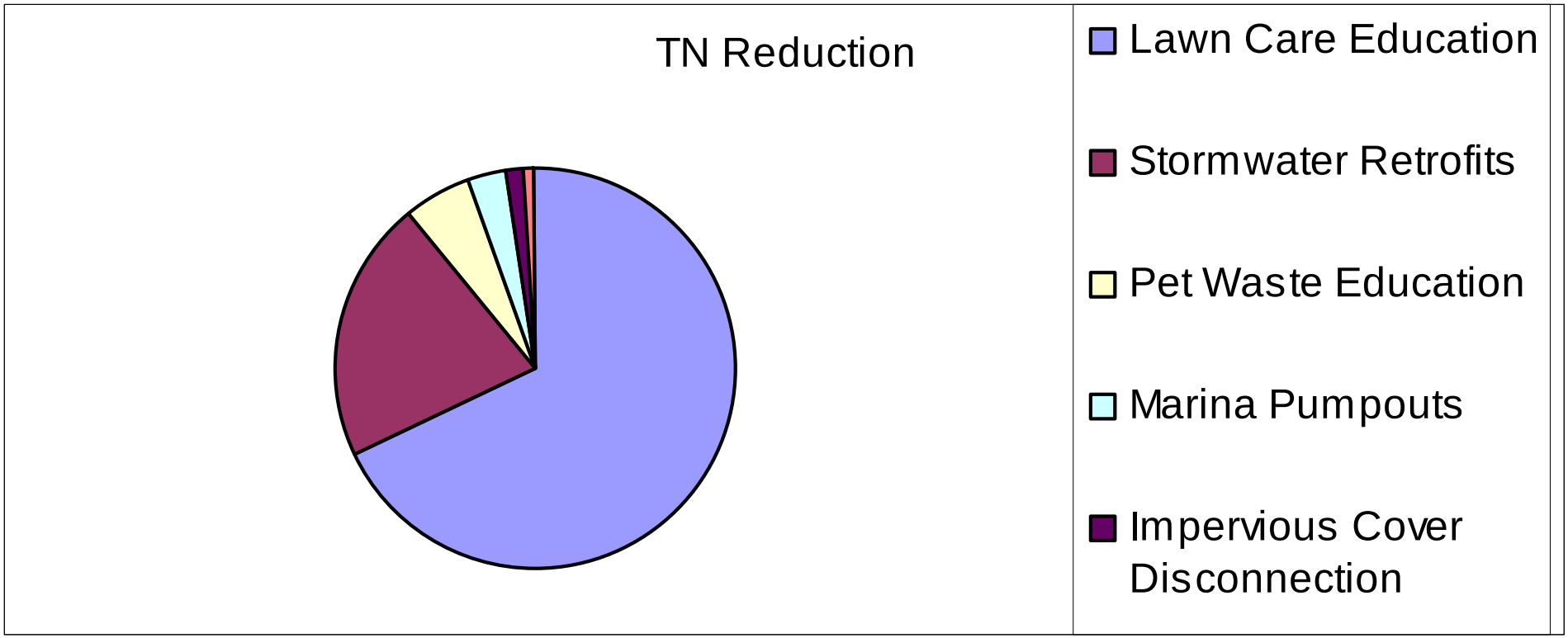
•Measure the area of roof that uses your downspout.

- •Measure only the footprint of your house; don't calculate the rise of your roof. Remember, the same amount of rain falls on your roof regardless of the roof's pitch.
- •Often a gutter will have downspouts at two ends. In this case, assume half the water will go to each downspout.

Load Reduction Estimates

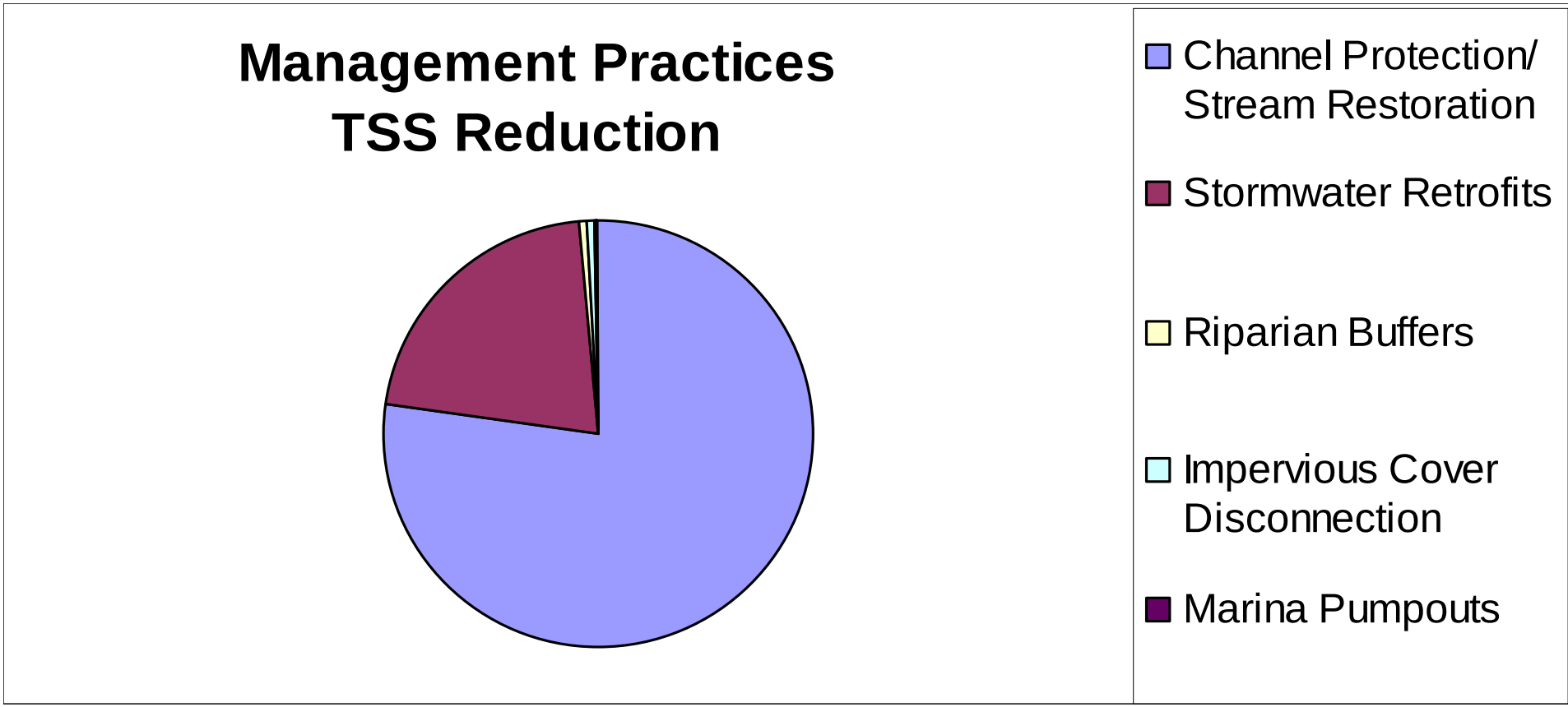
- Calculated using the WTM (Caraco, 2002)
- Parameters modeled included TN, TP, TSS and Fecal Coliform
- Modeled our watershed plan recommendations based on field and watershed assessment

Projected Load Reduction



- Overall nitrogen loads could be reduced close to 15%

Projected Load Reduction



- TSS loads could be reduced by 1/3

Findings

- Greater amount of watershed treatment possible with addition of LID practices
- There were a number of sites where traditional retrofit concepts were the best alternative – constrained on-site location, uninterested property owner or could improve existing practice
- Importance of public education programs for nitrogen management in a watershed with a lot of residential and commercial land
- Importance of channel protection in combination with stream restoration